

Spacecraft Thermal Control System Not Requiring Power, Phase I

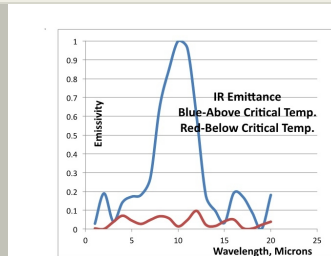
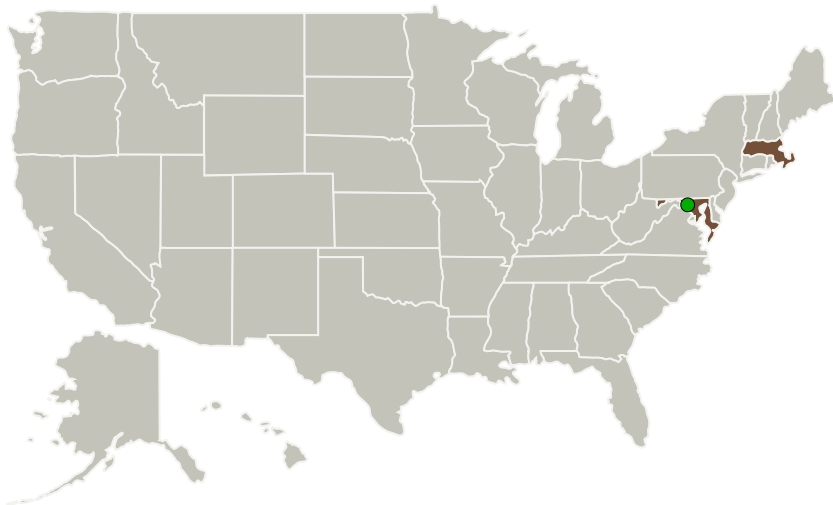
Completed Technology Project (2014 - 2014)



Project Introduction

The thermal management of spacecraft would be enhanced by dynamic control over surface emissivity in the mid-infrared. In this SBIR program, Triton Systems proposes to demonstrate a flexible film material whose emissivity self-switches from a low value to a high value when the film temperature exceeds a preset value. The wavelength of peak emissivity can be engineered between 1.5 to 15 μm as desired, and the transition temperature can be varied between 5-70 C. The film is easily engineered for different requirements, and if desired, different film characteristics could even be applied to different areas of the same spacecraft. No external power is required. The film substrate is a light weight flexible material that can be produced in large areas by roll-to-roll nanoimprinting. Triton Systems has substantial background in the computational design and fabrication of these types of switchable emissivity materials. In addition to NASA applications, the material will serve military needs such as IR signature control for ships, aircraft, UAVs or land vehicles, commercial needs in thermo-photovoltaics, and for energy efficiency in residential and commercial architectural uses for walls, roofs and windows.

Primary U.S. Work Locations and Key Partners



Spacecraft Thermal Control System Not Requiring Power
Project Image

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Organizations Performing Work	Role	Type	Location
Triton Systems Inc.	Lead Organization	Industry	Chelmsford, Massachusetts
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations

Maryland	Massachusetts
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Project Transitions

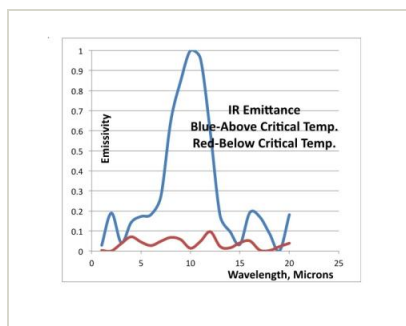
▶ **June 2014:** Project Start

✓ **December 2014:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/140599>)

Images



Project Image

Spacecraft Thermal Control System
Not Requiring Power Project Image
(<https://techport.nasa.gov/image/132927>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Triton Systems Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Larry Domash

Co-Investigator:

Lawrence Domash

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Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.2 Thermal Control Components and Systems
 - └ TX14.2.3 Heat Rejection and Storage

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System